

WHAT IS CLAIMED IS:

1. An optical-disk reproducing apparatus capable of selectively reproducing an information signal from a first optical disk with recording tracks laid out thereon, being separated from each other by a track pitch equal to a first distance, or a second optical disk with recording tracks laid out thereon, being separated from each other by a track pitch equal to a second distance shorter than said first distance, said optical-disk reproducing apparatus comprising:

a radiation means for radiating an optical beam to an optical disk mounted on said optical-disk reproducing apparatus;

an objective lens for converging said optical beam radiated by said radiation means into an optical beam with a diameter smaller than said first distance but longer than said second distance;

a liquid-crystal means provided on an optical path between said objective lens and said radiation means;

a voltage-applying means for applying a driving voltage to said liquid-crystal means so as to change an electrode pattern of said liquid-crystal means;

a discrimination means for determining whether an optical disk mounted on said optical-disk reproducing

apparatus is a first optical disk or a second optical disk; and

a control means which drives said voltage-applying means to apply a driving voltage to said liquid-crystal means so as to generate such aberration in said optical beam that the diameter of said optical beam is set at a value close to said first distance when said discrimination means determines an optical disk mounted on said optical-disk reproducing apparatus to be a first optical disk.

2. An optical pickup apparatus comprising:

a light source for emitting an optical beam having a wavelength of about 780 nm;

an objective lens having a numerical aperture (NA) of about 0.62 and serving as a means for converging said optical beam emitted by said light source and then radiating said converged optical beam to said optical disk; and

a spot-diameter control means for controlling a spot diameter of said converged optical beam radiated by said objective lens to said optical disk.

3. An optical pickup apparatus according to claim 2 wherein said spot-diameter control means is an aberration-generating means for generating aberration in

said converged optical beam radiated by said objective lens to said optical disk.

4. An optical pickup apparatus according to claim 3 wherein:

said aberration-generating means is a liquid-crystal device; and

a driving voltage applied to an electrode pattern of said liquid-crystal device is controlled to adjust the spot diameter of said converged optical beam radiated by said objective lens to said optical disk.

5. An optical-disk recording & reproducing apparatus capable of recording and reproducing an information signal onto and from an optical disk with any of a plurality of types having different track pitches of recording tracks created on said optical disk, said optical-disk recording & reproducing apparatus comprising:

a disk-rotation-driving mechanism on which any one of optical disks with any of said types having different track pitches of recording tracks is to be selectively mounted;

a discrimination means for determining a type of an optical disk mounted on said disk-rotation-driving means;

a light source for emitting an optical beam having

a wavelength of about 780 nm;

an objective lens having a numerical aperture (NA) of about 0.62 and serving as a means for converging said optical beam emitted by said light source and then radiating said converged optical beam to an optical disk; and

a spot-diameter control means for controlling a spot diameter of said converged optical beam radiated by said objective lens to said optical disk,

wherein said spot-diameter control means adjusts said spot diameter of said converged optical beam radiated by said objective lens to said optical disk in accordance with the type of said optical disk determined by said discrimination means.

6. An optical-disk recording & reproducing apparatus according to claim 5, wherein said spot-diameter control means is an aberration-generating means for generating aberration in said converged optical beam radiated by said objective lens to said optical disk.

7. An optical-disk recording & reproducing apparatus according to claim 6, wherein:

said aberration-generating means comprises a liquid-crystal device and a driving-voltage-applying means for applying a driving voltage to said liquid-

crystal device; and

said driving voltage applied by said driving-voltage-applying means to an electrode pattern of said liquid-crystal device is controlled to adjust the spot diameter of said converged optical beam radiated by said objective lens to said optical disk in accordance with the type of said optical disk determined by said discrimination means.

8. An optical-disk reproducing apparatus capable of reproducing an information signal from an optical disk with any of a plurality of types having different track pitches of recording tracks, said optical-disk reproducing apparatus comprising:

a disk-rotation-driving mechanism on which any one of optical disks with any of said types having different track pitches of recording tracks is to be selectively mounted;

a discrimination means for determining a type of an optical disk mounted on said disk-rotation-driving means;

a light source for emitting an optical beam having a wavelength of about 780 nm;

an objective lens having a numerical aperture (NA) of about 0.62 and serving as a means for converging said optical beam emitted by said light source and then

radiating said converged optical beam to said optical disk; and

a spot-diameter control means for controlling a spot diameter of said converged optical beam radiated by said objective lens to said optical disk, wherein said spot-diameter control means adjusts said spot diameter of said converged optical beam radiated by said objective lens to said optical disk in accordance with the type of said optical disk determined by said discrimination means.

9. An optical-disk reproducing apparatus according to claim 8, wherein said spot-diameter control means is an aberration-generating means for generating aberration in said converged optical beam radiated by said objective lens to said optical disk.

10. An optical-disk reproducing apparatus according to claim 9 wherein:

said aberration-generating means comprises a liquid-crystal device and a driving-voltage-applying means for applying a driving voltage to said liquid-crystal device; and

said driving voltage applied by said driving-voltage-applying means to an electrode pattern of said liquid-crystal device is controlled to adjust the spot

diameter of said converged optical beam radiated by said objective lens to said optical disk in accordance with said optical disk's type determined by said discrimination means.

1. A method of controlling an optical beam radiated by an objective lens to an optical disk, comprising the steps of: determining a type of said optical disk; and controlling a diameter of said converged optical beam radiated by said objective lens to said optical disk in accordance with said optical disk's type determined by said discrimination means.